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A study on clinical, subclinical mastitis occurrences in Sahiwal and Karan fries cows under various climatic conditions using modified CMT test

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Abstract

Identification of risk factors and early diagnosis are the most important tools to control mastitis in dairy cows. In this study, California Mastitis Test (CMT) was performed to assess sub-clinical mastitis, and cows, udder and milk were examined for clinical mastitis. The incidence of occurrence of subclinical and clinical mastitis was calculated during summer, winter and thermo neutral seasons. A total of 165 (Sahiwal and KaranFries) cows taken from NDRI farm during early lactation. The incidence of occurrence of mastitis in Sahiwal was 45, 32 and 23% (subclinical) and 40, 27 and 33% (clinical) and 40, 33 and 27 percent (subclinical) and 41, 32, 27% (clinical) in KF cows during summer, thermoneutral and winter season respectively. Thus, highest incidence was found during summer thereby indicating that cows were more vulnerable to mastitis in summer.

Keywords: Clinical mastitis, subclinical mastitis, CMT

1. Introduction

Mastitis is a frequently encountered problem among the dairy animals; hence for better production animal should be healthy. Udder health is very much important to produce infection free milk. Because of the anatomical position, udder is subjected to harmful environment which leads to both inflammatory and non-inflammatory conditions leading to infectious diseases like mastitis. Mastitis is an extremely prevailing disease in dairy cattle leads to reduction in milk yield, increases culling rates, increases the treatment costs and occasionally results in death from severe infections (Radostitis *et al.*, 1994 and Radostitis *et al.*, 2000) ^[1, 2]. It is the most costly of all diseases in the dairy industry (Bradley, 2002) ^[3]. All methods of commercial milk production may provide suitable conditions for spreading mastitis organisms from cow to cow. Despite the continuous efforts for controlling mastitis at the herd level over the last decades, it has remained one of the predominant bacterial diseases in postpartum dairy cows. It occurs because of deficient management, improper milking procedures, faulty milking equipment, inadequate housing etc. Economic loss due to mastitis is \$35 billion per year world over (Sharma *et al.*, 2007) ^[4]. Money is lost due to treatments, discarded milk, lower milk output, decreased quality, and increased labour. Subclinical mastitis causes economic losses by decreasing milk production, costs of therapy, and unused milk during the withdrawal period (Atasever, Erdem, 2009) ^[5]. Clinical mastitis can be detected by the farmer, but subclinical mastitis can only be detected by the measurement of inflammatory components and pathogens in the milk (Nielen *et al.*, 1993) ^[6]. Since somatic cell count (SCC) in milk has been shown to be an excellent marker for subclinical mastitis (Dürr *et al.*, 2008) ^[7], the use of SCC is inevitable for specifying the reduction of the milk yield. The use of CMT to identify the infected quarters has been extensively evaluated (Ruegg, 2002) ^[8]. CMT remains the only reliable screening test for subclinical mastitis that can be easily used at the cowside. In a study, Philpott (1984) ^[9], demonstrated that an inverse relationship between somatic cell count (SCC) and milk yield (above 200000 cells/mL 2.5% decrease in yield for each 100000 cells/mL increase in SCC).

2. Materials Methods

The study was conducted in Livestock Research Centre (LRC) of NDRI, Karnal, and Haryana. The animals were kept under normal routine management practice as followed at the institute's farm.

All the cows were fed as per the standard feeding practices which consisted of concentrate mixture (mustard cake, maize, wheat bran, rice bran, mineral mixture and common salt) wheat straw and roughages (berseem, maize or jowar fodder). The feed and water was available ad libitum to these cows. The study has been conducted in all different season viz., Thermo neutral - (October-November), winter (December to January) and summer (April 15th -May). Initial screening of infected cows for clinical or subclinical mastitis was carried out on 92 KF and 73 Sahiwal cows. The milk of these cows was tested by modified California Mastitis Test (mCMT) for identification of sub-clinical mastitis. Cows suffering from clinical mastitis were diagnosed on the basis of clinical symptoms.

2.1 Study methodology

Clinical examination of the udder and screening using the CMT were carried out on farms for 165 lactating cows in order to determine subclinical mastitic cows.

2.1.1 Clinical inspection of the udder

Udders of the cows were examined visually and by palpating for the presence of any lesions, such as redness, pain, heat, and swelling. Moreover, milk samples from each quarter was taken and checked for any change in colour and consistency.

2.1.2 Modified California Mastitis Test (mCMT)

This test was done according to the method described by

Schalm and Noorlander^[10] at cowside, by mixing an equal volume of milk with equal volume of CMT reagent (Sodium hydroxide 1.5 g Teepol 0.5 ml Bromothymol blue 0.01 g Distilled water 100ml). Each quarter's milk sample was placed in clean wells of a plastic test paddle which divided into 4 separate wells. As the plate was rotated gently, any colour changes or formation of a viscous gel were interpreted.

3. Result and Discussion

The incidence of occurrence of subclinical and clinical mastitis was calculated on the basis of 165 (Sahiwal and K.F) cows taken from NDRI farm during early lactation in different seasons. Scores were given within the range 1-5, Score 1 indicates- appearance of the test reagent and the solution remained unchanged with the mixture remaining liquid. For score 2, Slight precipitation but no gel formation occur. Precipitate thickens and becomes concentrated towards the center of the plastic cup represents Score 3. For score 4, distinct gelling which adhered to the bottom of the paddle. Score 5 was given to thick gel formation immediately upon mixing of CMT reagent which shows strong positive.

The table (1) below shows the incidence of occurrence of clinical and subclinical mastitis in Sahiwal and KF cows (165) in NDRI farm. Highest number of subclinical mastitis cases (53) was found during summer followed by thermo neutral (41) and winter (32). Out of total 39 cases of clinical mastitis 16 were found during summer, 13 in thermo neutral and 10 in winter season.

Table 1: Incidence of subclinical and clinical mastitis during different Seasons Sahiwal and Karan Fries cows

Breed	Sahiwal				K.F			
	Type of mastitis	SCM	% occurrence	CM	% occurrence	SCM	% occurrence	CM
Thermo neutral	18	32	6	35	23	33	7	32
Winter	13	23	4	24	19	27	6	27
Summer	25	45	7	41	28	40	9	41
Total cows	56		17		70		22	

The incidence of occurrence of mastitis in Sahiwal was 45, 32 and 23% (subclinical) and 40, 27 and 33% (clinical) and 40, 33 and 27 percent (subclinical) and 41, 32, 27% (clinical) in KF cows during summer, thermo neutral and winter season respectively. Thus, highest incidence was found during summers thereby indicating that cows were more vulnerable to mastitis in summer. Keviletsu & Yadav (2010)^[11], reported that the occurrence of mastitis in Sahiwal and Murrah in NDRI farm was 26.43 and 18.91% respectively. The incidence was highest among cows calved in summer, whereas it was lowest in winter in Sahiwal and autumn calvers in Murrah. Quarter wise prevalence of sub clinical mastitis was observed to be 31.16% in K.F cows (Ashutosh *et al.*, 2017)^[12] similar to these observations we also observed lowest percentage of mastitis cases during winters. All the above results obtained in the present study supports that the different seasons have significant effect on incidence of occurrence of mastitis.

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